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Report of the Working Group of Operational Oceanographic Products for Fisheries and Environment (WGOOFE)

7-9 June 2010 and
22-24 November 2011

Brest France and
Bergen Norway



ICES

International Council for
the Exploration of the Sea

CIEM

Conseil International pour
l'Exploration de la Mer

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Executive summary

The Working Group of Operational Oceanographic Products for Fisheries and Environment (WGOOFE) is a working group on the user/provider interface of operational oceanography products. It runs a web based portal for operational oceanographic products for users in fisheries and environmental research (www.wgoofe.org). In 2010, it further developed its website and carried out a major outreach exercise with flyers, articles and a published paper. The web portal now has a working matrix of critically evaluated operational oceanographic products. The evaluations were on the basis of user friendliness and logistic operationality. WGOOFE met twice in 2010 and also worked intercessionally.

It appears that the producers of operational oceanographic products are investing in the development of tools to deliver data in real time, at high resolution, and have accordingly built large systems to handle these kinds of request. However, WGOOFE highlights a different requirement. There is a serious mismatch between the expectations from the end-users and the perception of data providers. This mismatch needs to be re-aligned to ensure the true operational delivery of oceanographic and environmental products.

Mechanisms or interfaces need to be found to address the naivety of marine data users about the magnitude of data available and its delivery from the producers. Producers should also make use of the tools available, which provide manageable historical data time-series. Combining the complexity of production with the simplicity of delivery is the key to progress.

WGOOFE will meet again twice in 2011 and continue both development and evaluation of products. It will meet with the new group on integrated assessments of the North Sea (WGINOSE) to investigate the users' needs for integrated assessments. It will also try to move the web portal from being housed at IFREMER to ICES. It aims will be to continue improving the utility, access and appropriateness of oceanographic data products.

1 The rational for WGOOFE

On the advice in 2007 of PGOOP (ICES Planning Group on Operational Oceanographic Products), a workshop WKOOP was initiated to suggest ways of developing and/or improving the dialog between producers of operational oceanographic products and the potential users of those products. It was also asked to define initial oceanographic products that can be regularly delivered to identified users. In the light of products, WKOOP was then expected to formulate a strategy and a work plan for a new working group on the user/provider interface of operational oceanography products. This recommended the instigation of WGOOFE which has now met 5 times in November 2008 and twice in 2009 and twice in 2010. This is the report of the two meetings in 2010. WGOOFE mostly operates through the WGOOFE website (www.wgoofe.org) currently house by Ifremer (Figure 1).

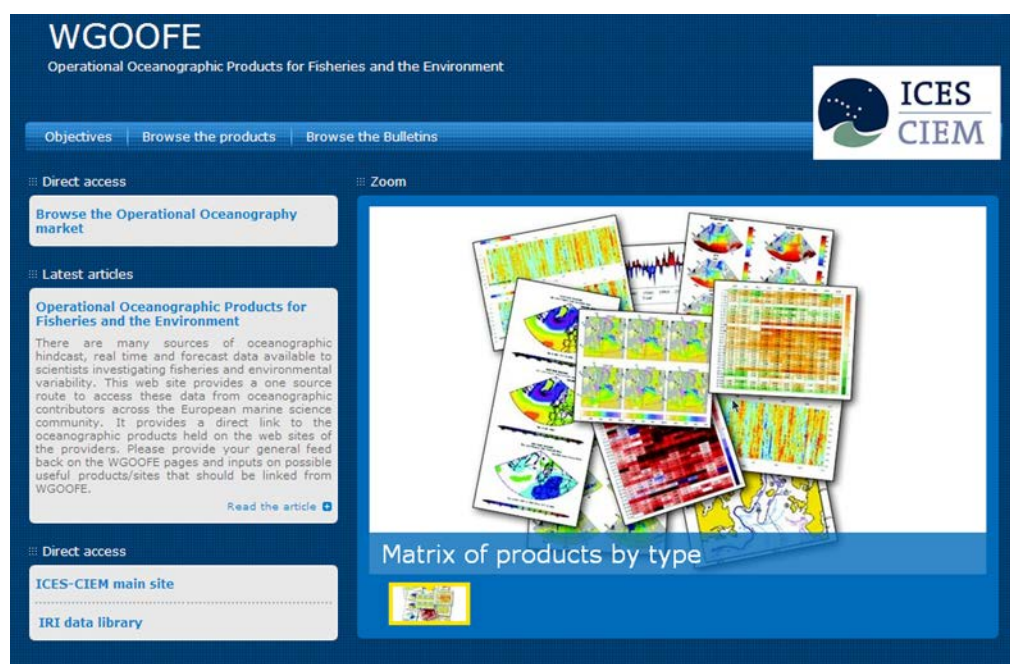


Figure 1. WGOOFE website portal to operational oceanographic productions by region.

2 Outreach and Publicity

Part of the remit of WGOOFE is outreach and informing the scientific community of the products which are available. This also involves publicising the WGOOFE website (see www.wgoofe.org). In 2010 WGOOFE created a flyer, wrote an ICES Insight article and submitted a manuscript for publication in the journal *Oceanography* (see annex 5). The flyer was aimed at the producers of oceanographic products and was widely circulated in the autumn of 2010; the ICES Insight article was aimed at the ICES science community and was published in September 2010 and the manuscript will be published in March 2011 and is aimed at oceanographers across the world (Bex *et al.*, 2011. Does Operational Oceanography Address the Needs of Fisheries and Applied Environmental Scientists? *Oceanography* vol 24, 6 pages). Copies of all of these products are available from the members of WGOOFE.

3 Redefine and critically evaluate operational oceanographic products [ToR a]

This worked followed on from the questionnaire, see last year's report. The final results of the analysis are not dissimilar from the preliminary analysis from 2009 (see Figure 2).

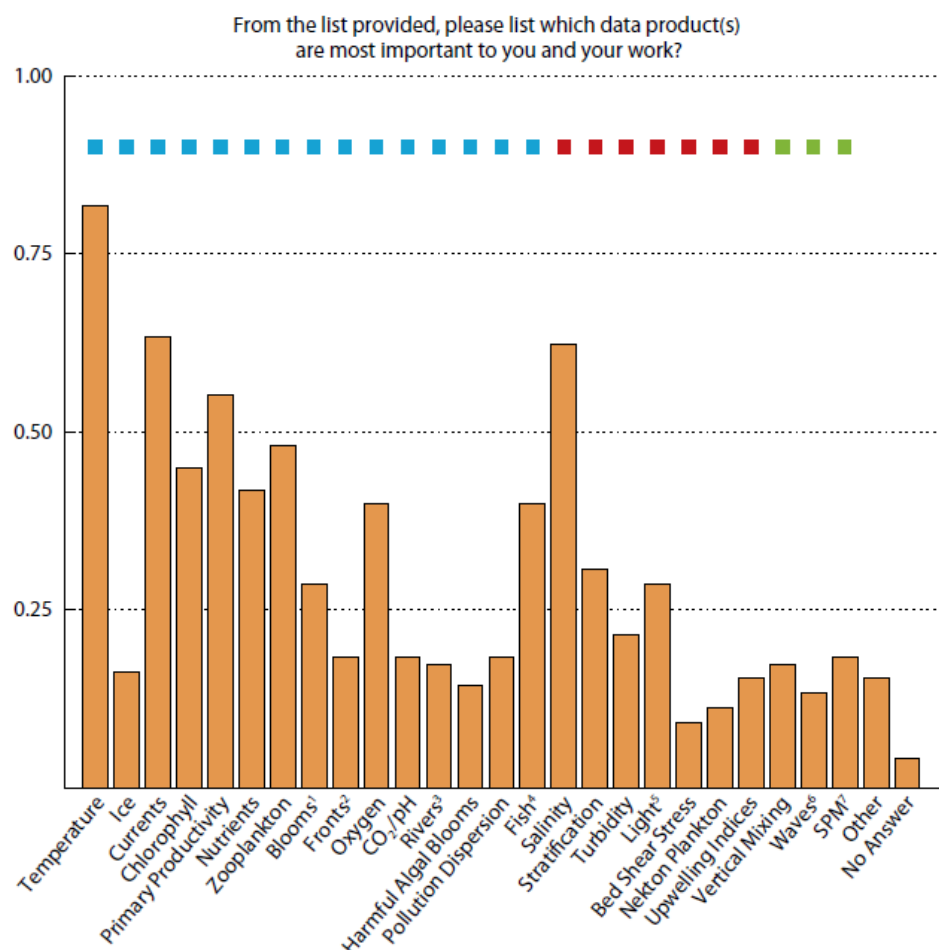


Figure 2. Required oceanographic variables for data products. Variables in the horizontal axis sorted according to initial ranking (ICES, 2009) with squares representing original ranking: blue = high, red = medium, and green = low. ¹ Blooms = blooms time/duration/intensity. ² Fronts = location of frontal regions. ³ Rivers = river plumes and loads. ⁴ Fish = fish larvae growth and distribution. ⁵ Light = light in the water column. ⁶ Waves = wave height and direction. ⁷ SPM = suspended particulate matter.

Figure 2. Operational Oceanography products requested by the ICES community. Figure taken from Berx *et al.*, 2011.

It appears that the producers of operational oceanographic products are investing in the development of tools to deliver data in real time, at high resolution, and have accordingly built large systems to handle these kinds of request. However, the WGOOFE study clearly demonstrates a different requirement where end-users (from marine environmental and fisheries research) require analysis products that aggregate information both spatially and temporally. They also request historical time-series information. This represents a mismatch between end-user expectations and the perception of data providers. This mismatch needs to be re-aligned, to ensure the true operational delivery of oceanographic and environmental products.

Mechanisms or interfaces need to be found to address the naivety of marine data users about the magnitude of data available and its delivery from the producers. Dialogue and education is also needed to allow users be more specific about their data requirements and needs. Producers should also make use of the tools available, which provide manageable historical data time-series. Combining the complexity of production with the simplicity of delivery is the key to progress.

WGOOFE is proposing to include products from North America in the website by 2011.

4 Develop criteria for WGOOFE housed products [ToR d]

The criteria have been developed. They are also clearly stated on the WGOOFE website (www.wgoofe.org). Each product by region is now labelled through a traffic light scheme. The colour of the product informs on the legibility and accessibility of the data products, but does not indicate on the quality nor validity of the data itself.

The criteria are:

- 1: Data can be downloaded for free
- 2: User needs to register before downloading
- 3: Viewing data is possible
- 4: Data description is available (method, reference, relevance -data format, update frequency)
5. Contact person

Each product is then scored as green, amber or red on the following basis:

Green fulfils criteria: 1+3,4,5

Amber fulfils criteria: 1 or 2 + at least 2 out of (3,4,5)

Red are all the other products.

Many of the most complex products are in fact considered red under this system. WGOOFE proposes in 2011 to inform the product producers that their sites are listed on the WGOOFE website and also inform them of the ranking (green, amber or red) that their products have received.

The website also classifies the products by type:

Observation: raw in-situ observations from fixed stations, drifters, research vessels, ferrybox

Climatology: analysed products from in-situ data

Satellite: remote-sensing data

Forecast: results of models run in forecast mode. Archives of the model results may be provided.

Hindcast: results of models run in hindcast mode with (reanalysis) or without assimilation.

It is hoped to build in conforming to ISO standards (e.g. ISO 19115 and ISO 19139) as a criteria as well.

5 Continue intercessional development of web based products [ToR b]

Many of WGOOFE are producers of products and the development continues through many different projects. WGOOFE, through its outreach, is hoping to influence the producers of products so that the fisheries and applied environmental scientists are considered. Some of the more recent developments are being made available through EMECO and MyOcean (www.emecogroup.org, www.myocean.eu.org). These are all being considered by WGOOFE and added to the website as they are made available.

6 Identify Gaps in products [ToR c]

The matrix of products available on the WGOOFE website highlight the gaps in products. There is still a shortage of time-series and of “more biological” products. Users appear to want data products with a monthly or annual resolution (aggregated to this temporal scale) of a historic time-series. The preference is for annual, quarterly or monthly updates to these series. Most ICES scientists request products with a broad spatial scale of aggregated data from 10km to larger (sea or region). Good quality metadata on the methods used was also seen as important. Many operational oceanographic products currently offer only graphical outputs such as maps, and this contrasted greatly with the requirements of the ICES users, most ask for the opportunity to download the numerical data.

Whilst NetCDF files are becoming standard for the delivery and manipulation of meteorological and oceanographic data, the majority of users request the delivery in ASCII or spreadsheet formats. This preference appears similar across scientists, regardless of their data manipulation and software expertise. ICES scientists do not seem to understand the magnitude of data available, and the implications of this on its use and manipulation. As an example, requests for monthly average fields on a 10-by-10 km horizontal, and 10 m depth bin vertical resolution for the North Sea for the past 40 years, cannot be accommodated via ASCII file formats. Either users will need to familiarise themselves with scientific data formats, such as NetCDF, and/or providers will need to incorporate new web applications and services to allow less familiar users to preselect subsets of data and download them in a choice of formats (e.g. THREDDS, Live Access Servers, Dapper). WGOOFE members have experience of fisheries scientists being overwhelmed when asked what data they want and thus requesting everything. They then complain that they cannot cope with the large size and awkwardness of the data when it was delivered. The interaction between producers and users must be an iterative process. Products must keep developing in light of users changing needs and expectations. As environment or fishery management integrates more and more the spatial dimension, and becomes more operational in its delivery, the request in products is likely to change rapidly. The delivery of data to users has many associated challenges. Data quality, data ownership, and lack of influence on their use are often raised as concerns, which can only be addressed by transparent communication.

It appears that the producers of operational oceanographic products are investing in the development of tools to deliver data in real time, at high resolution, and have accordingly built large systems to handle these kinds of request. However, WGOOFE has highlighted a different requirement. This represents a serious mismatch between the expectations from the end users and the perception of data providers. This mismatch needs to be re-aligned to ensure the true operational delivery of oceanographic and environmental products.

7 Joint Meetings [ToR e]

WGOOFE approached many different ICES working groups to arrange either joint or “back to back” meetings. WGOOFE did not receive very positive responses from the groups, many were busy having joint meetings with other groups. However the regional integration groups were much more positive, thus WGOOFE will have an overlapping meeting with WGINOSE (Integrated Ecosystem, Assessments of the North Sea) in Hamburg in spring 2011.

8 Recommendation: Moving the WGOOFE website to ICES [ToR f]

During 2010, WGOOFE, the ICES data centre and WGDIM (Data and Information Management) all discussed the idea of moving the WGOOFE website from Ifremer to ICES. In Bergen, WGOOFE and the ICES data centre agreed to begin the move in 2011. There will be challenges, but all parties are keen for a successful transition from Ifremer to ICES. The WGOOFE website name and link will be maintained, but the website will come under the ICES website.

9 Further work of WGOOFE

WGOOFE also discussed the role of WGOOFE within ICES. This was especially important due to the closure of the operational oceanography group which normally dealt with GOOS matters for ICES. It was an animated discussion. However a consensus was reached that WGOOFE saw its role a facilitator of access to products, of highlighting problems in the development process and as an interface between producers and users of operational oceanographic products. It was not there to work directly on ocean observing nor to investigate scientific questions. Thus was best handled through other groups and specialised research projects.

In 2011, WGOOFE hopes to further work on refining and critically evaluating the operational products to the needs of the users. It plans to consider the ISO standards within products. It also hopes to look critically at products from the Northwest Atlantic. It will pursue the move of the website from Ifremer to ICES. It will also encourage the intercessional development of the web based products (either from institutes, projects or individuals). WGOOFE will meet with WGINOSE to highlight gaps in data products required for an integrate ecosystem assessment and further investigate users needs.

The future remit of WGOOFE needs to be addressed in 2011. The group must address whether there is a need for WGOOFE beyond 2011. If the group decides to continue, new chairs will need to be found as both Morten and Mark will have completed their time as chairs in 2011.

Annex 1: List of participants

NAME	ORGANISATION	E-MAIL	JUNE BREST	NOV BERGEN
Mark Dickey-Collas (Chair)	IMARES	mark.dickeycollas@wur.nl	X	X
Morten D. Skogen (Chair)	IMR	morten@imr.no	X	X
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Yann-Hervé De Roeck	Ifremer	yhdr@ifremer.fr	X	-
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Henning Wehde	IMR	henningw@imr.no	-	X

Annex 2: Agendas for 2 meetings

AGENDA WGOOFE, Brest, France, 7-9 June 2010

Monday 7 June

1300: Welcome, housekeeping (Mark, Morten, Yann-Herve)

- Partner presentations/updates (All)
- Summary of questionnaire. What's next?? (Bee, Mark, Morten)
- ToR d): Develop criteria for WGOOFE housed products – traffic light??
- ToR a): Refine and evaluate products
- ToR b): Continue development of web-based products
- ToR c): Identify gaps in available products

1730: End of Day 1

Tuesday 8 June

0930: Start of meeting

- Continue ToR d), a), b), c)

1300: Lunch

1400: Continue

- Continue ToR d), a), b), c)
- Joint WGOOFE publication (Bee, Mark, Morten)

1730: End of Day 2

2000: Dinner hosted by Ifremer

Wednesday 9 June

0930: Start of meeting

- ToR e): Joint meetings with other WGs
- ToR f): Housing of WGOOFE website
- AOB
- Summary of meeting, plans for next meeting (Mark, Morten)

1200: End of Meeting

AGENDA WGOOFE, Bergen, Norway, 22-24 November 2010

Monday 22 November

1200: Lunch

1300: Welcome, housekeeping (Mark, Morten)

- Brest action list (all)
- Website status
- ToR f): Housing of WGOOFE website
- ToR d): Develop criteria for WGOOFE house products

1700: End day-1

Tuesday 23 November

0930: Start day-2

- cont. ToR_FD
- ToR b): Continue development of web-based products
- ToR c): Identify gaps in available products
- ToR e): Joint meetings with other WGs

1200: Lunch

1300: cont.ToR_ABCE

1700: End day-2

1900: Dinner

Wednesday 24 November

0930: Start day-3

- cont.ToR_ABCE
- Reporting, Plans-2011
- AOB

1200: Lunch

1300: End of meeting

Annex 3: Terms of Reference for WGOOFE 2010

2009/2/SSGSUE04 The **Working Group on operational oceanographic products for fisheries and environment** (WGOOFE), chaired by Morten Skogen, Norway, and Mark Dickey-Collas, the Netherlands, will meet twice in 2010 at Ifremer, Brest, France, 7–9 June 2010, and at IMR, Bergen 22–24 November 2010 to:

- a) Refine and critically evaluate the operational products to the needs of the users, including format and timing, and highlight appropriate and most operational products for each region;
- b) Continue intercessional development of the web based products (either from institutes, projects or individuals) for testing with other ICES WG (see TOR e) based on recommendations of the 2009 WGOOFE report;
- c) Identify gaps in the products available, and define new products from this;
- d) Develop criteria for WGOOFE housed products (e.g. the levels at which products should be available, the availability and perhaps registration for data, clarity of text, agreed terms and acronyms);
- e) Plan joint meetings to discuss product development with example ICES working group such as WGPBI and WGHAB;
- f) Initiate discussions with ICES data centre and WGDIM about appropriate housing of the WGOOFE website in the future;
- g) Develop terms of references based on a work plan for the next two years, which complement the objectives of the ICES science plan.

WGOOFE will report by 1 December 2010 (via SSGSUE) for the attention of SCICOM and ACOM.

Annex 3: Terms of Reference for WGOOFE 2011

The **Working Group on operational oceanographic products for fisheries and environment (WGOOFE)** chaired by Morten Skogen, Norway, and Mark Dickey-Collas, the Netherlands, will meet twice in 2011 at vTI, Hamburg, Germany, 22-23 February 2011, at the UK Metrological Office, Exeter, UK 15-17 November 2011 to:

- a) Meet with WGINOSE to investigate the operational oceanographic product requirements for integrated ecosystem assessments;
- b) Beginning to move the WGOOFE website from Ifremer to ICES;
- c) Inform producers of the WGOOFE criteria and the WGOOFE website grading of products;
- d) Investigate the need for ISO standards in products;
- e) Continue refining and critically evaluating the operational products to the needs of the users, including format and timing, and highlight appropriate and most operational products for each region, with special attention for the Northwest Atlantic.

WGOOFE will report by 1 December 2011 to the attention of the Steering Group of Sustainable Use of the Ecosystem.

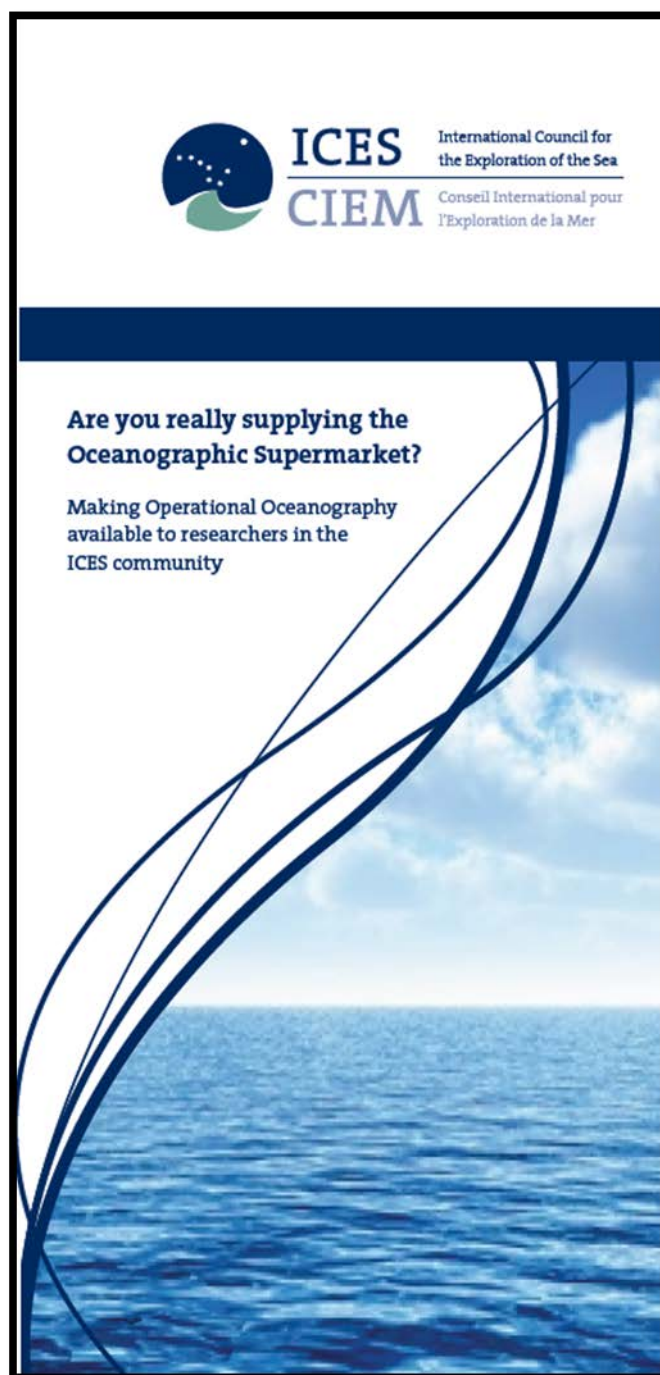
Supporting Information

Priority	There is an urgent need to incorporate the field of operational oceanographic products into ICES to be able to support fisheries research, assessment and management advice and other ecosystem approach related activities.
Scientific justification	WGOOFE justification: a) To make the products of WGOOFE relevant and encourage them to be used within ICES, it is essential to engage users in the work of the WG, and not make the group a fora only for operational oceanographers. b) Available operational oceanographic products are to be used as initial products to initiate a dialogue with the users of their needs and possible use of the products. c) The dialogue will define improved products to better meet the user needs d) To ensure regularity of the products to be delivered WGOOFE will identify the producers e) Several large projects are running operational oceanographic services. To ensure the relevance of their works, WGOOFE will establish a close dialogue with these initiatives to stimulate for delivery of relevant (to ICES) products.
Resource requirements	No specific resource requirements beyond the need for members to prepare for and participate in the meeting, and preferably participation from ICES data centre
Participants	The Group should have participants from organizations dealing with operational services and/or development of operational techniques, and participants that are identified of users of such products.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to advisory committees	An obvious very close link with ACOM activities.

Linkages to other committees or groups	There would be a strong interaction with other experts groups within OCC such as WGZE, WGHABD, WGOH and WGRP, and modelling activities e.g. in WGPBI, PGNSP, NORSEPP, WGRED, REGNS. Later also with the ICES Advisory Programme.
Linkages to other organizations	The WG must interact with IOC/JCOMM/GOOS/EuroGOOS/ArcticGOOS/GMES/GEOSS. The group should also have a close relationship with MyOcean

Annex 5: Outreach Published or Prepared in 2010

The Flyer



The ICES Insight Article, September 2010:



WGooFE
HOOKING UP DATA USERS WITH DATA

Barbara Berx, Mark Dickey-Collas, and Morten Skogen describe a disconnect between data producers and data users, and explain how WGooFE is making new connections.

In a marine science and management world that increasingly emphasizes a multidisciplinary approach, a world in which large projects often drive collaborations across the fields of oceanography, fishery management, and environmental research, many ICES scientists are under the impression that the data they need are not available. They believe that they have been left to their own devices to find environmental information that supports their research and advisory roles.

In fact, many sources of oceanographic and environmental data are readily available.

ICES Working Group on Operational Oceanographic Products for Fisheries and Environment (WGooFE) was established in spring 2008 to remedy this gap in awareness. It acts as a two-way link between the producers and users of oceanographic data products, has developed a web portal for oceanographic products, and is working to establish more detailed user requirements. The working group consists of data producers (mostly scientists from meteorological or operational

The magic portal to oceanographic data
The working group is particularly proud of the website created under its guidance, <http://www.wgoofe.org>, which is currently hosted by Ifremer. It acts as a data portal to various existing oceanographic data products and offers links to empirical (based on physical observations), modelled (based on a computer model or numerical simulations), and integrated (created by combining data residing in different sources) products for forecast, real-time, and time-series research.

Scientists are under the impression that the data they need are not available

A new development allows users to search for oceanographic data based on parameter type (e.g. temperature, salinity), rather than being limited to

The Published Paper in 2011 – Oceanography volume 24.

REGULAR ISSUE FEATURE

Does Operational Oceanography Address the Needs of Fisheries and Applied Environmental Scientists?

BY BARBARA BEX, MARK DICKEY-COLLAS, MORTEN D. SKOGEN, YANN-HERVÉ DE ROECK, HOLGER KLEIN, ROSA BARCIELA, RODNEY M. FORSTER, ERIC DOMBROWSKY, MARTIN HURET, MARK PAYNE, YOLANDA SAGARMINAGA, AND CORINNA SCHRUM

ABSTRACT. Although many oceanographic data products are now considered operational, continued dialogue between data producers and their user communities is still needed. The fisheries and environmental science communities have often been criticized for their lack of multidisciplinary, and it is not clear whether recent developments in operational oceanographic products are addressing these needs. The International Council for the Exploration of the Sea (ICES) Working Group on Operational Oceanographic products for Fisheries and Environment (WGOOFE) identified a potential mismatch between user requirements and the perception of requirements by the providers. Through a questionnaire (98 respondents), WGOOFE identified some of these issues. Although products of physical variables were in higher demand, several biological parameters scored in the top 10 rankings. Users placed specific focus on historic time series products with monthly or annual resolution and updating on similar time scales. A significant percentage requested access to numerical data rather than graphical output. While the outcomes of this survey challenge our views of operational oceanography, several initiatives are already attempting to close the gap between user requirements and products available.

INTRODUCTION

Operational oceanography aims to provide oceanographic information and data in a routine manner from

forecasting, and over the past decade, a significant amount of effort has been devoted to the development of pan-European operational capability

and Forecasting System (ECOOP; <http://www.ecoop.eu>). As a result, many oceanographic data products are now considered operational, and the concept has become a reality. Advances in modeling biogeochemical systems, together with increased computer power and societal demand for this information, have translated into the expansion of operational systems to include fully coupled ecosystem models and their products (Brasseur et al., 2009). Many of the current suite of operational products are oriented toward real-time monitoring and short-term forecasting (e.g., ECOOP and MyOcean, <http://www.myocean.eu.org>). It has always been clear, however, that the products made available must be developed in collaboration with their users (Nowlin and Malone, 2003; Polfeldt, 2006).